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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,476	07/11/2003	Yasuo Shimizu	8373.305US01	5302
23552	7590	05/18/2005	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			HURLEY, KEVIN	
			ART UNIT	PAPER NUMBER
			3611	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/618,476	SHIMIZU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kevin Hurley	3611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 1 is/are allowed.  
6) ☒ Claim(s) 2 is/are rejected.  
7) ☒ Claim(s) 3 and 4 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurokawa et al. 6,516,915 in view of Ballard.

Kurokawa et al. discloses power steering apparatus comprising:

a steering system including a rack and pinion assembly 4,5;

an electric motor 8 producing steering assist torque corresponding to steering torque applied to said steering system;

and a worm gear mechanism transmitting the steering assist torque to the steering system,

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wherein said worm gear mechanism includes a worm 9 operatively connected to said electric motor and a worm wheel 10 operatively connected to said steering system and meshing with said worm, and said worm wheel being made of a resin.

Kurokawa et al. discloses the claimed invention except the worm is not single threaded.

It is known in the art, for example as disclosed by Ballard (column 4 lines 7-10) to use a worm which is single threaded, in order to minimize back drive.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kurokawa et al. by using a single thread worm, in view of Ballard, in order to minimize back drive.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frank et al. 5,267,627 in view of Oberg et al (reference U).

Frank et al. (see embodiment of Figs 9-10) discloses power steering apparatus comprising:

a steering system including a rack and pinion assembly 7,8;

an electric motor 17 producing steering assist torque corresponding to steering torque applied to said steering system;

and a worm gear mechanism transmitting the steering assist torque to the steering system,

wherein said worm gear mechanism includes a worm 17a operatively connected to said electric motor and a worm wheel 17b operatively connected to said steering system and meshing with said worm.

Frank et al. fails to disclose that the worm is a single thread worm but states "The lead

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angle between the worm 17a and the worm gear 17b is selected so as to provide a self-locking condition” (col. 7 lines 53-55).

Oberg et al. (see page 1886 5<sup>th</sup> paragraph) teaches that a single thread worm may be employed “especially if ‘mechanical advantage’ or self locking are important factors”.

Hence it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Frank et al. by using a single thread worm, in view of Oberg et al., in order to provide a self locking function.

#### ***Allowable Subject Matter***

5. Claim 1 is allowed.
6. Claims 3-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

7. Applicant's arguments filed 11 April 2005 have been fully considered but they are not persuasive. Regarding claim 2, applicant has argued that “The Ballard invention does not solve the problem in these conventional variations. In particular, the problem is not solved in rack and pinion helm systems.” However, it is noted that the rack and pinion themselves are irrelevant to the problem of back drive in a worm gearing assembly. The problem of back drive is only related to the shaft connected to the worm and the shaft connected to the worm gear. Ballard clearly teaches that using a single thread worm will reduce back drive between these two

members.

A new rejection has also been added noting that reducing back drive, also known as providing a self locking function, is a known advantage of single thread worms.

### *Conclusion*

8. All rejected claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

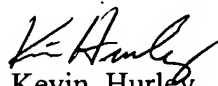
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Hurley whose telephone number is 571-272-6646. The examiner can normally be reached on Monday-Friday 9:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lesley Morris can be reached on 571-272-6651. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Kevin Hurley  
Primary Examiner  
Art Unit 3611

May 13, 2005